

## **AMENDMENTS TO THE CLAIMS**

The following listing of claims will replace all prior versions and listings of claims in the application.

### **LISTING OF CLAIMS**

1. - 22. (Canceled)

23. (Previously Presented) An apparatus comprising:

a fiducial marker including:

an imageable fiducial locator head that is locatable by an imaging system, the head being at least semispherical;

a conical receptacle that is sized and shaped for engaging a locator instrument of a positioning system, the receptacle is threaded and defined within the imageable fiducial locator head and wherein the conical receptacle has a base at an edge defined by a surface of the locator head and an apex at a center of the locator head to permit access to a center of the imageable fiducial locator head; and

a bone screw shaft that extends directly outward from the imageable fiducial locator head, at least a portion of the bone screw shaft is configured for being secured to a bone; and

a protective cap sized and shaped for protecting the fiducial marker, wherein the protective cap has a disk-like portion with a threaded portion extending from the disk-like portion that is threadable into the receptacle and a cylindrical circumferential skirt extending from the disk-like portion in the same direction as the threaded portion.

24. (Original) The apparatus of claim 23, in which the protective cap engages the head.

25. (Previously Presented) An apparatus comprising:

- a fiducial marker including:
  - an imageable fiducial locator head that is locatable by an imaging system, the head being at least semispherical;
  - a conical receptacle that is sized and shaped for engaging a locator instrument of a positioning system, the receptacle defined within the imageable fiducial locator head and configured to permit access to a center of the imageable fiducial locator head;
  - a bone screw shaft that extends directly outward from the imageable fiducial locator head, at least a portion of the bone screw shaft is configured for being secured to a bone; and
  - a protective cap sized and shaped for protecting the fiducial marker;
- wherein the protective has a proximal disk portion, a cylindrical circumferential portion extending from the proximal disk portion, and a distal base flange extending from the cylindrical circumferential portion;
- wherein the cylindrical circumferential portion extends a distance from the proximal disk portion such that the proximal disk portion extends over the imageable fiducial locator head and the distal base flange;
- an adhesive portion positioned at the distal base flange for adhering the distal base flange to a scalp.

26. - 51. (Canceled)

52. (Previously Presented) An apparatus comprising:

a fiducial marker including:

a substantially spherical imagable fiducial locator head that is locatable by an imaging system, the imagable fiducial locator head including at least one slot extending through a side wall of the imageable fiducial locator head to be engaged by a driving instrument for driving the fiducial marker to secure it to a bone;

a conical receptacle that is sized and shaped for engaging a locator instrument of a positioning system, the receptacle integrated with the imagable fiducial locator head and configured to permit access to a center of the imagable fiducial locator head;

a bone screw shaft that extends outward from the imagable fiducial locator, the shaft integrated with the imagable fiducial locator head, at least a portion of the bone screw shaft being configured for being directly secured to the bone; and

a protective cap sized and shaped for protecting the fiducial marker;

wherein the protective cap has a proximal disk portion, a cylindrical circumferential portion extending from the proximal disk portion, and a distal base flange extending from the cylindrical circumferential portion;

wherein the cylindrical circumferential portion extends a distance from the proximal disk portion great enough such that the proximal disk portion extends over the imageable fiducial locator head and the distal base ring flange portion;

an adhesive portion positioned at the distal base flange for adhering the distal base flange to a scalp.

53. – 64. (Canceled)

65. (Previously Presented) A method comprising:

driving directly into a bone of a patient a fiducial marker device including both an at least semispherical imageable fiducial locator head and an integral conical receptacle in the imageable fiducial locator head sized and shaped for mating to an instrument detectable by a positioning system and configured to permit access to a center of the imageable fiducial locator head;

obtaining, using an imaging system, an image of the patient, the image including the imageable locator head;

mating the instrument to the receptacle to register an actual position of the patient to the image of the patient; and

disposing a protective collar into association with the fiducial marker device by passing a shaft extending from the imageable fiducial locator head through a peripheral slot and a radial slot in a base of the protective collar.

66. (Previously Presented) The method of claim 65, further including capping the collar after disposing the protective collar into association with the fiducial marker device to at least partially house the fiducial marker device.

65. - 75. (Canceled)

76. (Previously Presented) An apparatus comprising:

- a fiducial marker including:
  - an imageable fiducial locator head that is locatable by an imaging system;
  - a male or female receptacle that is sized and shaped for engaging a locator instrument of a positioning system, the receptacle integrated with the imageable fiducial locator head; and
  - a bone screw shaft extends directly outward from the imageable fiducial locator head, at least a portion of the bone screw shaft is configured for being secured to a bone; and
  - a protective cap sized and shaped for protecting the fiducial marker;
- wherein the protective cap includes an inner member defining an external thread and outer member defining an internal thread, wherein the outer member can be rotated relative to the inner member to adjust a height of the outer member relative to the inner member.

77. (Previously Presented) The apparatus of claim 76, in which the protective cap comprises:

- a disk-like portion including a threaded member extending from the disk-like portion to engage a thread in the conical receptacle to connect the inner member and the imageable fiducial locator head.

78. – 100. (Canceled)



101. (Previously Presented) A method comprising:

disposing a guide collar assembly a fiducial marker device, wherein the guide collar assembly includes a first inner member and a second outer member positioned around the first inner member;

driving directly into a bone of a patient the fiducial marker device including both an imageable locator head and an integral male or female receptacle sized and shaped for mating to an instrument detectable by a positioning system through the guide collar assembly;

leaving the first inner member of the guide collar assembly about the fiducial marker during a time period in which the patient is to be protected against a mechanical impact to the fiducial marker after the driving;

removing the first inner member of the guide collar assembly laterally from the fiducial marker;

obtaining, using an imaging system, an image of the patient, the image including the imageable locator head; and

mating the instrument to the receptacle to register an actual position of the patient to the image of the patient.

102. (Previously Presented) The method of claim 101, further including drilling a hole into the bone before the driving, and wherein the driving includes screwing into the hole.

103. (Previously Presented) The method of claim 101, further including placing a cap in a divot of a fiducial marker.

104. - 107. (Canceled)

108. (Currently Amended) ~~The apparatus of claim 90,~~

An apparatus comprising:

a fiducial marker including:

a substantially spherical imageable fiducial locator head that is locatable by an imaging system, the imageable fiducial locator head including at least one slot for driving the fiducial marker to secure it to a bone;

a receptacle that is sized and shaped for engaging a locator instrument of a positioning system, the receptacle defined within the imageable fiducial locator head to permit access to a center of the imageable fiducial locator head;

an imageable plug, sized and shaped to fit within the receptacle defined within the imageable fiducial locator head, wherein the imageable plug includes a fin operable to cooperate with the slot such that the imageable fiducial locator head and the imageable plug together present a uniformly shaped imageable portion to the imaging system;

a bone screw shaft that connects to and extends directly outward from the imageable fiducial locator head, at least a portion of the bone screw shaft being configured for being directly secured to the bone, at least a portion of the bone screw shaft being externally threaded and including a quarter cylindrical cutout extending from a distal tip of the shaft; and

a protective cap sized and shaped to fit over the imageable fiducial locator head;

wherein the ~~cover~~ protective cap includes a connection member operable to engage the receptacle when the imageable plug is removed.